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U. S. DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT

Range Studies -
Condition & Trend

TWO-PHASE RANGE CONDITION SURVEYS
SUPPLEMENTAL INSTRUCTIONS FOR FIELD USE
by MILO H. DEMING - REVISED MAY, 1964*

The Two-Phase Method for making comprehensive range condition surveys is described fully in Condition Surveys of the Bureau of Land Management Manual. These supplemental instructions are prepared for ready reference in the conduct of field work. They afford some additional hints and explanation of the local application and adaptation of general principles referred to in the accompanying Range Condition Criteria Index (Revised May, 1964)*

The essentials for Two-Phase Method Surveys are:

(1) A plant classification list -- prepared locally in advance of field work.
(2) A Range Condition Criteria Index
(3) A supply of forms No. BLM 2-407 or similar -- for field observation write-ups.
(4) A map of the area to be surveyed -- any convenient scale for field use.

This method gives equivalent but separate ratings to the two most significant phases of the range resource complex; i.e. the forage stand and protection and erosion of the soil. The ratings for these two phases are further considered in combination for comprehensive classification of range condition by relative terms commonly used by range managing agencies. The recording system used on field sheets and maps maintains separate ratings for each phase at each observation station so that arithmetic computation of changes in each can be made locality by locality at the time of subsequent resurveys.

Forage Stand Consideration -- Phase I

This phase deals with plants on the basis of their relative contribution to the crop of forage being produced on any particular site. The three items of Quality, Vigor and Reproduction are rated with particular reference to how well the valuable and desirable plants are faring in competition with undesirable plants under current circumstances of growth and grazing use. The aggregate numerical rating derived for the three forage stand items represents how closely the conditions approach what is considered to be the full potential capability of the particular site.

*These revised (May, 1964) supplemental instructions were finalized at the Wyoming State Range Study Workshop, May 21, 1964. They have not been approved and should be used only for field testing purposes.

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SITE AND SOIL MANTLE CONSIDERATION -- PHASE II

This phase deals with the protective cover and soil erosion conditions. It considers all forms of vegetation and litter with reference to the protective cover it forms and the influence exerted on soil and water movement under prevailing climatic conditions and extent of erosion under these conditions.

SOME BASIC PRINCIPLES

(1) The purpose of a range condition survey is to judge the health of the range.

(2) Resurveys of range condition after intervals of several years will reveal the direction of trend and magnitude of the changes which have occurred.

(3) The frequency of making field observation write-ups is governed by the necessity for sampling any significant changes in vegetational types, range sites, or use patterns. So long as these remain reasonably similar a single write-up will apply. Greater intensity of sampling makes the definition of condition class zone boundaries more exact.

(4) Waste (unusable) ranges are not rated but are typed out as such on range condition and trend maps.

COMPARISON AREAS

Better understanding of the production potentials of various range sites may be had if ungrazed or lightly grazed areas are visited first and carefully rated. This helps to establish some definite criteria for making relative comparisons with findings on similar sites and in similar types. Local relict areas should be sought for observations on species composition, vigor and form of plants.

LOCAL PLANT CLASSIFICATION LISTS

Separate lists of all the important plant species found in the local plant communities are prepared in advance of field work. These lists show a relative desirability classification (as high, medium, low, or worthless) for each species. These local plant lists become the foundation for judging the local relationships of desirable and undesirable plants as described for rating purposes in the Range Condition Index.

COMBINATION RATINGS AND MAP COLOR LEGEND

Two-Phase combination ratings are written thus: 40/20, the first figure always representing the aggregate forage stand index rating and the second figure always representing the aggregate protection and erosion index rating. Entry of this combination rating symbol on the field and record maps identifies the approximate location at which the corresponding field write-up was made.

The sum of the two figures which comprise the combination rating determines the appropriate range condition class according to where it falls within the following scale of numerical values for each condition class.

From	To	Range Condition Class	Map Zone Color
(Not Rated)		Waste-unusable	Red Hatchure
*********		For Usable Range Only	**********
0	20	Bad	Red
21	40	Poor	Orange
41	60	Fair	Yellow
61	80	Good	Green
81	100	Excellent	Blue

MAPS

Maps are an indispensable part of range condition survey records. Entry of the Two-Phase symbol on the map identifies the approximate location where the corresponding field write-up was made but the exact area of reference for each observation station is not bounded on the map. All observation stations for which the combination ratings fall within the numerical limits prescribed for each condition class are circumscribed by a zone boundary line. The zone or area occupied by each condition class is thus distinguised on the map for coloring and separate acreage computations.

Field maps may be of any convenient scale available. Large scale maps often contain topographic detail or vegetation type lines which facilitate the location of condition class boundaries. For permanent district record purposes the field information obtained should be transferred to district maps no larger in scale than 1/4 or 1/2 inches per mile. The area covered by surveys each year should be identified by dating with the year of survey in order to plan the cycle for periodic resurveys of particular units.

TREND AND TREND SYMBOLS

Trends describe the progressive pattern of changes in range condition which develop over a period of at least several years time. These should be distinguished from the short term fluctuations which occur from year to year with more or less erratic patterns usually associated with climatic variation.

When former acquaintance of the examiner with any range area or when periodic resurveys permit a reliable observation of trend, the following symbols will be used to indicate trends appropriately on the field write-up form, No. II-407, and on maps prepared to show trends.

Symbol	Name	Interpretation
++	Double plus	Very marked upward trend, and/or great increase.
+	Single plus	Definite and significant upward trend, and/or small increase.
±	Balance	Stable or indefinite position. Change is too small for positive determination of trend in either direction.
−	Single minus	Definite and significant downward trend, and/or small decrease.
=	Double minus	Very marked downward trend, and/or great decrease.

Correlation with Other Records

Range Condition surveys picture cumulative results but do not disclose definite reasons for the prevailing conditions. The reasons must be developed through correlated analysis of other historical and contemporary records which afford local details about the circumstances of forage production and its use. The cumulative influences most responsible for range condition and trends are seasonal and yearly variation in grazing pressure and weather. Consequently, timely records of actual stocking, utilization results, improvement installations, forage production circumstances, and weather influence must be kept or consulted to assign valid reasons for the existing situation. Correlation of such records with survey findings will indicate the nature and some measure of adjustments required to correct unsatisfactory or maintain satisfactory conditions.

RANGE CONDITION CRITERIA FOR TWO PHASE METHOD SURVEYS

(Revised May, 1964)*

PHASE I - FORAGE STAND INDEX RATINGS

QUALITY: Judge the proportionate relationship of plants composing the stand which are respectively of high forage value, of intermediate forage value, of low forage value, and worthless for forage. Local lists of plants so classified are essential.

20 -- At least half of the stand is composed of high quality perennial forage plants. Remainder of the stand is mostly medium value plants, with minor percentages of low value and few worthless plants. (High quality annual plants may be considered here if they persist and are available for use throughout the grazing season).

15 -- At least one-third of the perennial forage plants are of high quality. Medium value plants may be predominant. Low quality and/or worthless plants may not exceed one-fourth of the stand. (Annual plants of high and medium quality but short-lived usefulness are considered here).

-- High quality perennial forage plants are few. A major percentage of the forage plants are of medium and low value. Worthless plants comprise a significant percentage of the stand. (Annual plants of medium and low value and with short life are considered here).

5 -- Outstanding preponderance in proportion of low value and/or worthless plants in the stand. (These may be either annuals or perennials). Remaining percentage of stand is principally composed of inferior or medium value plants. High quality plants are negligible or relics.

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0 -- An extreme situation - where only low value or plants worthless for forage comprise the stand.

VIGOR: Judge the relative degree of health and thrift of valuable and desirable forage plants. This is evidenced by their size, height, shape, color, firmness of rooting, amount of leafage or shoot production and flower or seed stalk abundance. Consider adversely the comparative vigor of competing undesirable plants.

20 -- Valuable and desirable plants are robust, of maximum height and excellent color, well formed and producing abundant leafage, seed stalks and shoots. They are firmly rooted and show no signs of weakness or malformation.

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-- Valuable and desirable plants are of medium size, fair height, and with a medium volume of leafage and shoot production. Grass clumps may be small or sods patchy. Shrubs have relatively fewer and shorter shoots or may be somewhat distorted in form.

10 -- Valuable and desirable plants are low or short, poorly formed and unthrifty. Leafage and shoot production is limited. Grass clumps may have dead centers, sod formations may be broken and irregular. Shrubs are malformed or scrawny.

5 -- Valuable and desirable plants are critically weak and decadent with poor color, stunted form, and with very limited leafage or shoot production. Grass tufts or shrubs often infirmly rooted or pedestaled.

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0 -- Extreme situation - valuable and desirable plants are barely existing relics, or dying.

REPRODUCTION: Judge the comparative abundance and evidence of survival of seedlings and younger age classes of the valuable and desirable forage plants. Usually these are in competition with low value and worthless plants for future increases and replacements in the stand.

-- Reproduction of valuable and desirable plants is abundant. It is outstandingly predominant in all the younger age classes and seedlings. This indicates the constant presence of sufficient reproduction to build and maintain dominance of the better forage plants.

15 -- Reproduction of valuable and desirable plants occurs in near equal amounts and frequency with that of low value or worthless plants.

10 -- Reproduction of valuable and desirable plants is scanty. It is in the minority in most younger age classes and may be overshadowed by that of low value and worthless plants.

5 -- Reproduction of valuable and desirable plants is rare or negligible in amount. That of low value or worthless plants is predominant in all the younger age classes. This indicates that the undesirable plants are definitely and dominantly in control of the stand.

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0 -- Extreme situation - no evidence that valuable and desirable plants are reproducing and surviving in the stand.

PHASE II - PROTECTION AND EROSION

PROTECTIVE COVER: Judge the relative density and mass effectiveness of the cover formed by all kinds of vegetation, including litter, shrubs and trees, which shield the soil mantle from disturbance by water and wind. Note size and pattern of bare spaces.

20 -- A maximum expected cover interrupted with some small and widely spaced openings. Usually it affords good protection against erosive forces, but the nature of cover and dispersion of plants or litter leaves some marginal openings bare.

15 -- A medium cover of vegetation, or a thick cover with large and patchy openings or open stands of "annuals" which persist to maintain cover. These are moderately or partially effective as protection against erosive forces.

10 -- A thin cover of vegetation or litter, or ephemeral and short-lived annual plants, or scattered clumps and islands of vegetation in large bare openings. These are only slightly effective against erosive forces.

5 -- Widely dispersed and scanty cover of vegetation and litter, or annual vegetation that vanishes quickly or appears only in some years. Ineffective against erosive forces as most of the ground surface is uncovered most of the time.

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0 -- Extreme cases.

EROSION: Judge comparatively the present rate of erosional activity by the degree of soil disturbance or movement. Results of either wind or water erosive action or both should be considered.

20 -- Soil mantle is intact with slight or no evidence of soil movement. The soil is accumulating in place with little or no sign of transportation. Surface litter is usually developing in place. Drainageways and stream course are smoothly rounded and apparently well stabilized.

15 -- Movement of soil is plainly apparent and recent. There may be slight terracing, or occasional plants on pedestals, or a few small rill gullies in exposed places. Some sediment deposits occur intermittently in runoff channels or against small obstructions elsewhere. Water courses and drainageways are fairly stable but well defined.

10 -- Well advanced and active soil erosion is evident. Usually there are active gullies to aid soil carriage and plants are on pedestals of soil. Drifted soil or debris deposits are very noticeable against minor surface obstructions. Drainageways show silt deposits or sandy material along channels

or in fans and evidence of instability and active bank cutting. Erosion pavement is well formed on gravelly or stony soils but the pattern is open. Transported soil appears about shrub clumps.

5 -- Severe soil erosion conditions: There is exposed subsoil, closed erosion pavement on stony soils, many active and frequent gullies, sharply incised drainage channels, large fan deposits of soil and debris which includes gravel and rocks. There are wind scoured depressions and active wind cutting or embryonic dunes in sandy situations. Water course channels are commonly straight walled and deep sunk in valley floors.

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0 -- Extreme situation.

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